

Claims

We claim:

- 1 1. A method for improving transmit diversity gain in a wireless
2 communication system including a transmitter with a plurality of transmit
3 antennas and a receiver with one receive antenna, comprising:
4 partitioning the plurality of transmit antennas into a plurality of
5 groups of transmit antennas;
6 measuring, in the receiver, a phase of a channel impulse response for
7 each transmit antenna;
8 determining, independently, feedback information for each group of
9 transmit antennas from the channel impulse responses;
10 sending the feedback information for each group of transmit antennas
11 to the transmitter;
12 orthogonal space-time block encode input symbols in the transmitter
13 to produce a data stream for each group of transmit antennas; and
14 adaptive linear space encoding each data stream according to the
15 feedback information for the group to produce an encoded signal for each
16 transmit antenna of each group.
- 1 2. The method of claim 1, wherein the determining further comprises:
2 selecting one of the channel impulse responses as a reference channel
3 impulse response; and

4 normalizing the measured phase according to a phase of the reference
5 channel impulse response so that a normalized phase is in a quadrant phase
6 sector of the reference phase.

1 3. The method of claim 2, in which the reference channel impulse response
2 has a highest power.

1 4. The method of claim 2, in which the quadrant phase sector spans ninety
2 degrees.

1 5. The method of claim 2, in which the normalization rotates the phase, and
2 the feedback information encodes an amount of rotation.

1 6. The method of claim 1, in which there are four transmit antennas, and
2 each group has two transmit antennas and the feedback information is one
3 bit for each group.

1 7. A wireless communication system, comprising:
2 a transmitter comprising:
3 a plurality of groups of transmit antennas;
4 means for generating input symbols;
5 an orthogonal space-time block encoder configured to produce
6 a data stream for each group of transmit antennas;
7 an adaptive linear space encoder configured to produce an
8 encoded signal for each transmit antenna of each group from the data
9 stream for the group according to feedback information for the group;
10 and

11 a transmitter, comprising:
12 a single receive antenna;
13 means for measuring a phase of a channel impulse response for
14 each transmit antenna;
15 means for determining independently the feedback information
16 for each group of transmit antennas from the channel impulse
17 responses;
18 means for sending the feedback information for each group of
19 transmit antennas to the transmitter.